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EXAMINER

CHEN, TIANJIE

ART UNIT

PAPER NUMBER

2652

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/943,507

Applicant(s)

OHTOMO ET AL.

Examiner

Tianjie Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,6,9,12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7,8,10,11,14 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-15 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Non-Final Rejection

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

2. Applicant's election with traverse of species Ib with claims 1, 4-8, and 10-15; and claims 1, 4, and 10 are generic in Paper No. 6 filed 06/20/2003 is acknowledged. The traversal is on the ground(s) that "Since claims are not rejected, applicants submit that allowable claims are present and the election requirement should be withdrawn." This is not found persuasive because the allowability of the generic claims is to be determined in examination. Only upon the allowance of a generic claim is determined after examination, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

The requirement is still deemed proper and is therefore made FINAL.

Furthermore, claim 12 depends from claim 2, but claim 2 is not elected; therefore, claim 12 has been withdrawn from consideration.

Claims 6 and 13 recite "said upper magnetic pole front end layer consists of a plurality of magnetic layer having different saturation magnetic flux densities;" however, species Ib does not show this feature. Claims 6 and 13 are withdrawn from consideration.

Claims 1, 4, 5, 7, 8, 10, 11, 14, and 15 are under consideration.

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Drawings

3. The corrected or substitute drawings were received on 06/20/2003. These drawings are approved.

Information Disclosure Statement

4. Reference JP 2000-276707 submitted fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 4, 5, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Sasaki et al (US 6,577,475).

With regard to claims 1 and 4, Sasaki et al shows a thin film head in Figs. 6 and 7 including in combination: a reading part consisting of a magnetic shield layer 3 (Column 8, line 11) and a reading element 5 (Column 8, line 26) formed on a substrate 1 (Column 8, line 8); and a recording part consisting of a lower magnetic pole 8a+8b+8c (Column 11, lines 14-16), an upper magnetic pole 13 (Column 11, line 17), coils 10 (Column 11, line 45), and a non-magnetic insulating layer 11 (Column 10, line

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16); wherein the lower magnetic pole consists of a lower magnetic pole main layer 8a, a lower magnetic pole front end portion 8b, and a lower magnetic pole rear end portion 8c; the upper magnetic pole 13 has its front end portion opposite to the lower magnetic pole front end portion through a recording gap layer 12 and its rear end portion connected magnetically to the lower magnetic pole rear end portion (Fig. 6A); the coils 10 are disposed between the lower magnetic pole main layer and the upper magnetic pole; the non-magnetic insulating layer 11 is filled among the coils, the lower magnetic pole main layer and the upper magnetic pole; the lower magnetic pole front end portion 8b has a width in the track width direction smaller than the width of the lower magnetic pole main layer 8a (Fig. 6B) and has, at the upper magnetic pole side, a projection step portion having a width in a floating surface almost equal to the track width (Fig. 6B); the upper magnetic pole consists of an upper magnetic pole front end layer, an upper magnetic pole rear end layer, and an upper magnetic pole top layer (Fig. 6A); and a surface for defining a gap depth of the lower magnetic pole front end portion is formed almost perpendicular to the recording gap surface, so that the height of the lower magnetic pole front end portion in the medium running direction is 0.3 μm to 2 μm (Column 9, line 5-7).

With regard to claim 4, Sasaki et al further shows in Fig. 6B that the lower magnetic pole front end portion has a width in the track width direction smaller than the width of the lower magnetic pole main layer and has, at the upper magnetic pole side, a projection step portion having a width in a floating surface almost equal to the track width and lower pole 8a having a width in the position away from the floating surface in the head rear portion direction larger than the width of the upper magnetic pole 13B (Fig. 7, wherein the arrow 13 erroneously marked, which should be marked

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as 8); and a surface for defining a recording gap depth of the lower magnetic pole front end portion is formed almost perpendicular to the recording gap surface.

With regard to claim 5, Sasaki et al further shows in Fig. 9 the upper magnetic pole front end layer 13A has a width corresponding to the track width from the floating surface to the magnetic pole expansion position 13B, so as to increase the width from the magnetic pole expansion position to the head rear portion direction.

With regard to claim 11, Sasaki et al further shows the lower magnetic pole front end portion is produced on the lower magnetic pole main layer.

A "product by process" claim is directed to the product per se, no matter how actually made, see *In re Hirao*, 190 USPQ 15 at 17 (footnote 3 CCPC, 5/27/76); *In re Brown*, 173 USPQ 685 (CCPA 5/18/72); *In re Luck*, 177 USPQ 523 (CCPA, 4/26/73); *In re Fessmann*, 180 USPQ 324 (CCPA, 1/10/74); *In re Thorpe*, 227 USPQ 964 (CAFC, 11/21/85). The patentability of the final product in a "product by process" claim must be determined by the product itself and not the actual process and an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Claim 11 is a product with process claim. The process portion "flame plated" will not be considered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al in view of Hiner et al (US 6,504,676) and Andricacos et al (IBM Journal, Vol. 42, 1998).

With regard to claims 7 and 14, Sasaki et al shows a thin film magnetic head as described above, wherein the lower magnetic pole front end portion 8b is made of CoFe (Column 9, lines 17-24); but Sasaki et al is silent on the material for lower magnetic pole main layer.

Hiner et al shows a thin film magnetic head wherein the lower magnetic main layer 56 is made of NiFe (Fig. 8, column 4, lines 51-53).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use NiFe as taught by Hiner et al for the lower pole main layer in Sasaki et al's device. The rationale is as follows: Sasaki et al is silent on the material. Hiner et al teaches that using NiFe for the lower pole main layer would prevent the magnetic head from running into premature magnetic saturation at the pole tip region (Column 4, lines 57-59). Furthermore, NiFe is the most popular material in the art for making yokes, i.e. making lower pole main layers. One of ordinary skill in the art would have been motivated by Hiner et al's teaching to use NiFe for the lower pole main layer for preventing magnetic saturation.

Andricacos et al further shows in Table 1 that CoFe has higher saturation flux density than NiFe; it means that in the above constructed device, the saturation magnetic flux density of the magnetic material used in lower magnetic pole front end layer is higher than that of the magnetic material for use in the lower magnetic pole main layer.

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7. Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al in view of Hiner et al (US 6,504,676) and Lederman (IEEE Transaction on magnetics, V. 35, No. 2, pp 794-799, 1999).

With regard to claims 8 and 15, Sasaki et al shows a thin film magnetic head as described above, wherein the lower magnetic pole front end portion 8b is made of CoFe (Column 9, lines 17-24); but Sasaki et al is silent on the material for lower magnetic pole main layer.

Hiner et al shows a thin film magnetic head wherein the lower magnetic main layer 56 is made of NiFe (Fig. 8, column 4, lines 51-53).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use NiFe as taught by Hiner et al for the lower pole main layer in Sasaki et al's device. The rationale is as follows: Sasaki et al is silent on the material. Hiner et al teaches that using NiFe for the lower pole main layer would prevent the magnetic head from running into premature magnetic saturation at the pole tip region (Column 4, lines 57-59). Furthermore, NiFe is the most popular material in the art for making yokes, i.e. making lower pole main layers. One of ordinary skill in the art would have been motivated by Hiner et al's teaching to use NiFe for the lower pole main layer for preventing magnetic saturation.

Lederman further shows in Table 1 that CoFe has lower specific resistivity than NiFe; it means in the above constructed device, that the specific resistance of the magnetic material for use in the lower magnetic pole main layer is higher than that of the magnetic material for use in the lower magnetic pole front end portion.

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8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al in view of Bian et al (US 6,572,989).

With regard to claim 10, Sasaki et al shows a thin film head as described above, but does not show a magnetic disk apparatus including: a magnetic recording medium; a motor for driving the same; a magnetic head for recording and reading onto the magnetic recording medium; a mechanism for positioning the magnetic head, a circuit system for controlling these; and a circuit system for supplying a recording signal to the magnetic head and processing a reading signal from the magnetic head; wherein at least the one thin film head according to any one of claims 1 and 4 is mounted as the magnetic head, and the magnetic recording medium has a coercivity of 279kA1m (35000e) or more.

Bian shows a magnetic disk apparatus in Fig. 4 (Column 5, lines 24-62) including: a magnetic recording medium 10; a motor 110 for driving the same; a magnetic head 130 for recording and reading onto the magnetic recording medium; a mechanism 150 for positioning the magnetic head, a circuit system 200 for controlling these; and an inherent circuit system for supplying a recording signal to the magnetic head and processing a reading signal from the magnetic head; and the magnetic recording medium has a coercivity of 279kA1m (35000e) or more (Column 4, lines 54-58 and Table 1).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the thin film head described above with the magnetic disk apparatus with the recording medium taught by Bian et al to obtain high recording density and improved signal to noise ratio. The rationale is as follows: Sasaki et al teaches that the thin film magnetic head is for improving the performance

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as the surface recording density of hard disk drive has increased (Column 1, lines 12-15), but does not show the disk drive. Bian shows a disk drive with recording medium, which is for increasing the area data storage density with improved signal to noise ratio (Column 2, lines 10-13). One of ordinary skill in the art would have been motivated by Sasaki et al and Bian et al's teaching to combine both together for improving the recording density and signal to noise ratio.

Conclusion

9. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-6037 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.



Tianjie Chen
Examiner
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July 3, 2003